

ABSTRACT

A multiple-layer diffusion junction capacitor structure includes multiple layers of inter-digitated P-type dopant and N-type dopant formed in a semiconductor substrate. An opening in a hard mask is formed taking care to control the angle of the sidewall using a dry, anisotropic etching process. P-type and N-type dopant are then implanted at positive and negative shallow angles, respectively, each with a different energy and dose. By utilizing the properly determined implant angles, implant energies and implant doses for each of the dopant types, a high capacitance and high density diode junction capacitor, with inter-digitated N-type and P-type regions in the vertical direction is provided.